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The MOVES Institute's Army Game Project

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The MOVES Institute's Army Game Project



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Overview

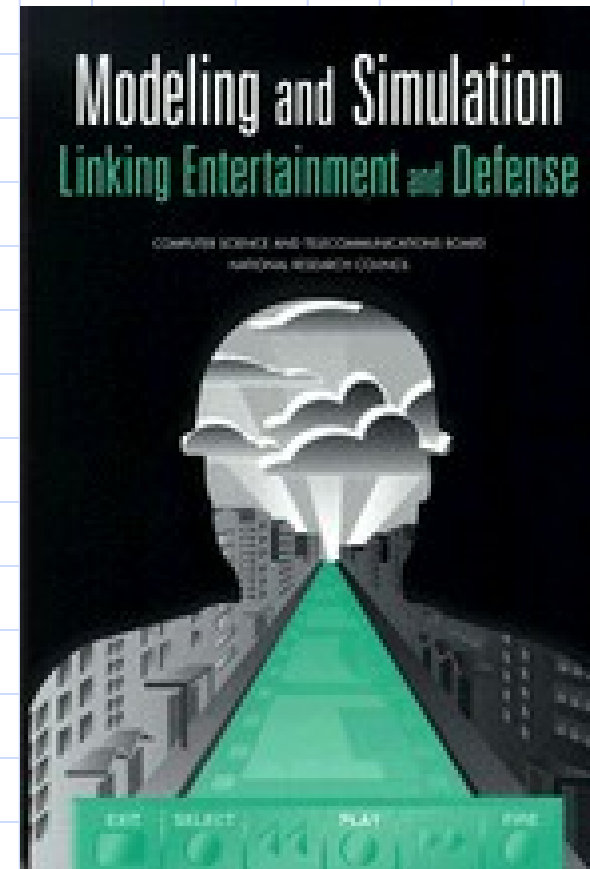
The NRC Report
Motivation & Goals
Building the R&D Teams
Researching the Army
America's Army: Operations
Operations Team Play
Immersive Sound
America's Army: Soldiers
The Story Engine

Instrumentation
Networking & Servers
Announcement & Release
- E3 and the 4th of July
Like Hotcakes
Nice Numbers
Conclusion

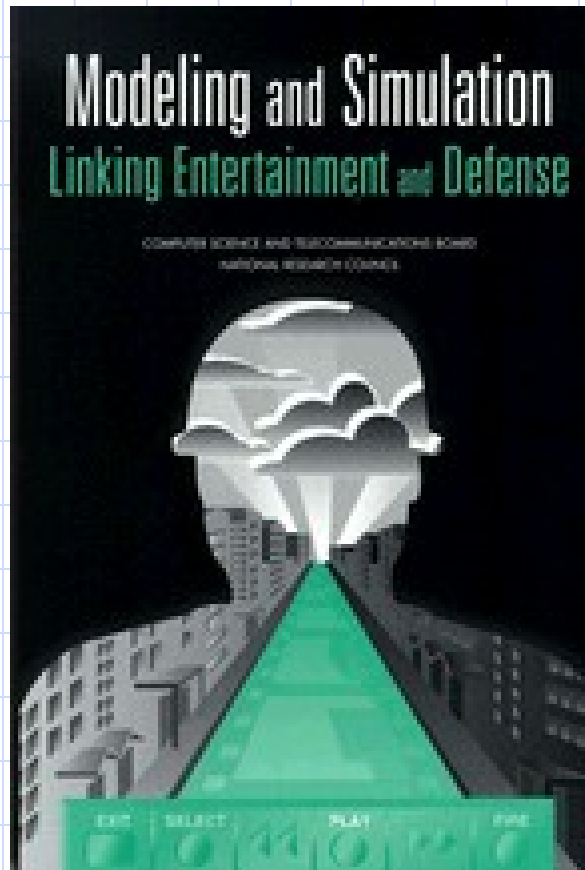
The NRC Report

In 1997, the National Research Council issued a report specifying a joint research agenda for defense and entertainment modeling systems and simulation. The report provided a guide to the R&D necessary to build such systems.

Included was an agenda treating immersive technologies, networked virtual environments, computer-generated autonomy, standards for interoperability, and tools for creating simulated environments.



The NRC Report

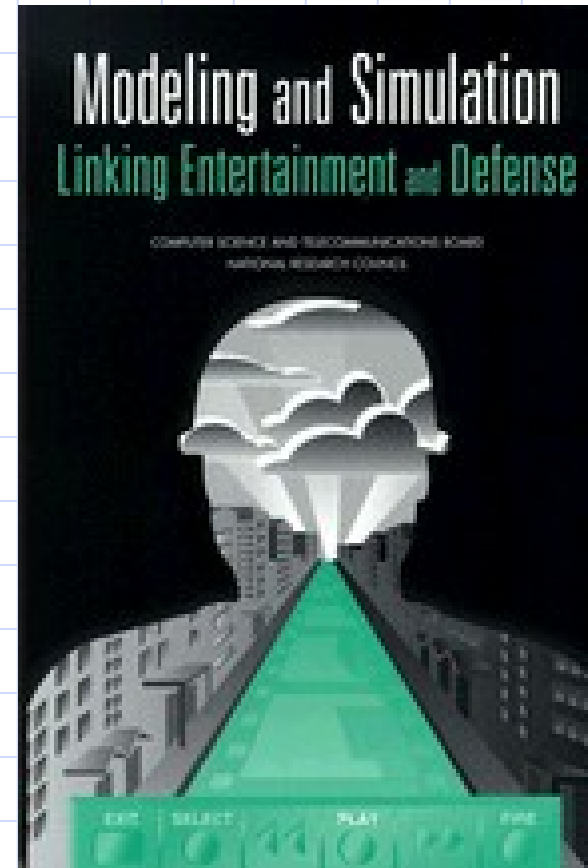


After the report's publication, the MOVES Institute aligned its research directions with the agenda described.

Entertainment as the main technology driver

The NRC report states that games and interactive entertainment (IE)—and not defense research expenditures—have become the main technology drivers for networked virtual environments.

To keep up with evolving modeling, virtual environment, and simulation technologies, it is important, according to the report, that DoD examine networked entertainment to ascertain the potential for joint investment or collaboration.



Army Game Project



In the fall of 1999, the MOVES Institute's Army Game Project (AGP) emerged as one such potential investment.

The AGP Project - Its Origins & Goals



The AGP effort originated with a discussion between the directors of the MOVES Institute and of the US Army's Office of Economic and Manpower Assessment (OEMA).

The Army was concerned about falling recruitment and perceived the need for new initiatives aimed at computer-literate recruits for today's high-tech Army.

The discussion turned to the medium of the PC game.



PC Games as a Medium for Strategic Communication



The use of popular entertainment media was already well familiar: the Army had piggybacked advertisements onto newsreels in movie theaters in the 1930s and 1940s and employed trailers in theaters and Super Bowl television advertisements in recent years. The question emerged, could the Army use PC games for strategic communication?

A modest proposal



The MOVES Institute proposed two games, ultimately named “Americas Army: Operations” and “America’s Army: Soldiers,” to recreate the U.S. Army for the benefit of young civilians.

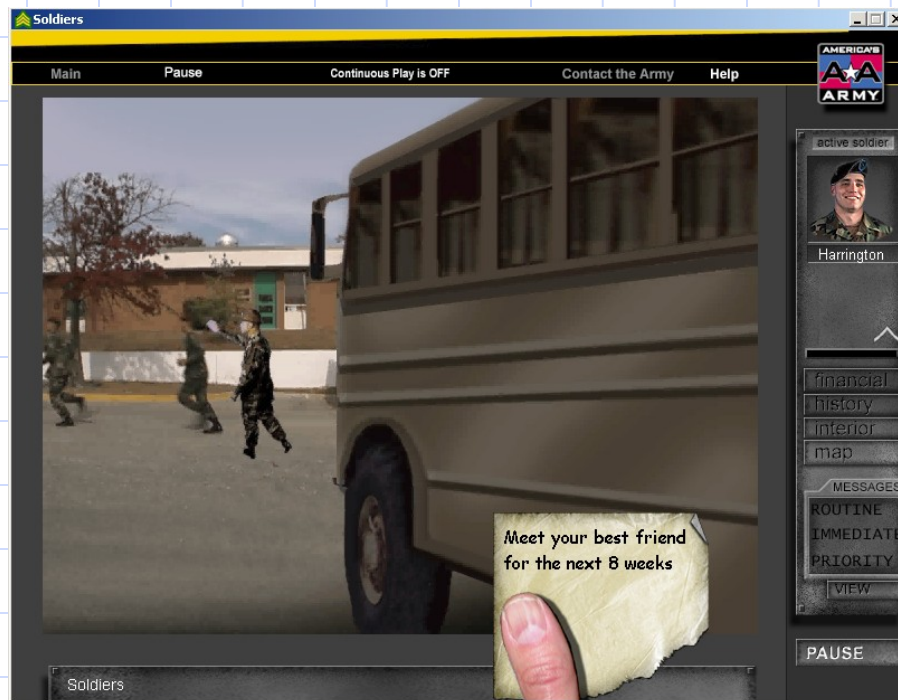
America's Army: Operations

The goal of “America’s Army: Operations” was to demonstrate life in the infantry.

It took shape as a first-person mission experience that starts with training, which is required—for example, a player cannot use a particular weapon without first qualifying on the appropriate range.



America's Army: Soldiers



“America’s Army: Soldiers” was conceived as a clear-eyed look at Army personal and career opportunities via sophisticated role-playing.

The player creates a character with which to identify, much like the popular “Sims” games, and moves through an interactive story constructed spontaneously in response to the character’s goals, resources and values.

The most technological game to date...

For the AGP project, MOVES envisioned a fully 3D, accurate gaming environment well beyond any product on the market, and technological efforts vastly more complex than previous attempts.

We wished to allow deep immersion in stories that were sensible-yet-surprising, interactive, and non-repeating.

We also wanted to ascertain whether we could compute the career aptitude of a user by his or her proficiency in play.

Built in secret ...



The two games were to be built secretly for twenty-four months, until results had been obtained, approvals secured from the Army, and the suite's debut had been made at Electronics Entertainment Expo (E3) in May 2002.

Funding start - May 2000



The first funding for the AGP project arrived in May 2000. At that time, a core group at MOVES had successfully constructed the large-scale networked virtual environment, NPSNET, and John Hiles, who had worked at Maxis on SimCity Supreme, SimAnt and SimFarm, had been brought in.

The MOVES AGP Team



MOVES began building a development team by networking with friends and consultants.

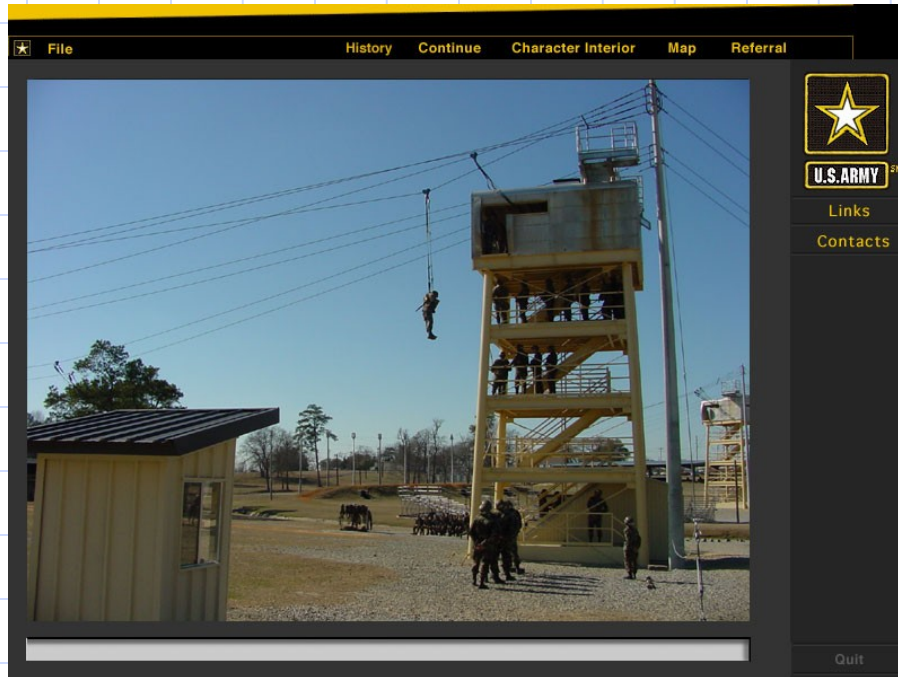
Veteran artists, designers, and programmers were recruited from industry giants such as Maxis, Electronic Arts, Sony, and Kalisto; between them, their expertise had yielded some 31 commercial games.

Team sizes

Twelve months from the May 2000 start, the “Operations” team employed 18 developers (level designers, artists, game programmers), and “Soldiers,” 10.



Researching the Army



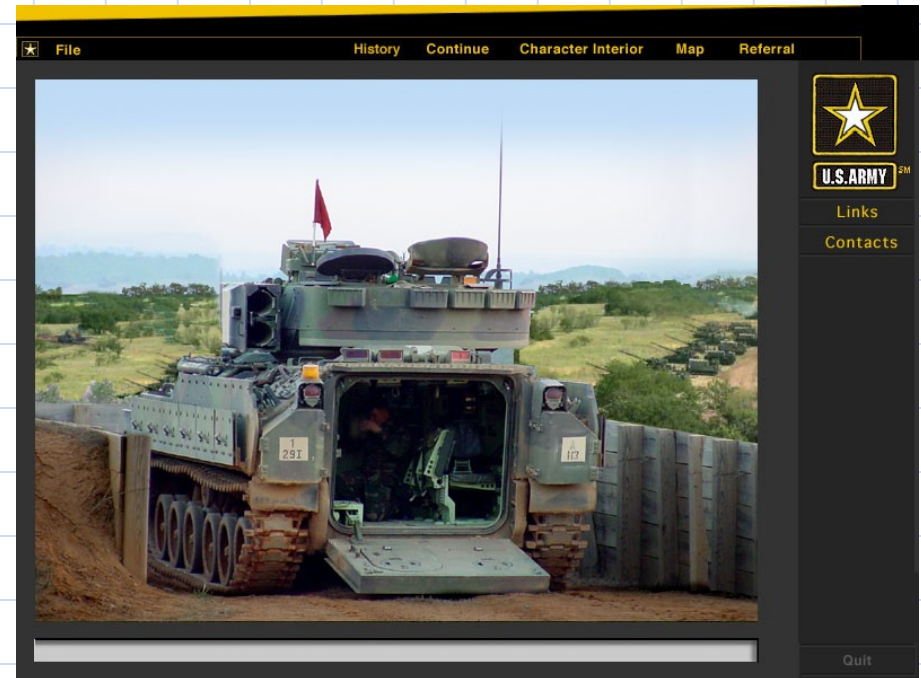
MOVES Institute researchers and developers visited some nineteen Army posts, videotaping, photographing, and recording audio of everything that moved—and didn't.

The team digitized video of soldiers in training, equipment and weapons, texture details such as chipping paint, and realistic minutiae such as the appearance of sand at Fort Benning, Georgia.

Learning to shoot ...

The team learned to shoot M-16s and sniper rifles, hurl hand grenades, and fire mortars. They went on night parachute jumps with the troops and fed themselves to the K-9 corps (wearing padded suits).

The post visits created an evermore motivated and informed group of level designers, artists, and game programmers, eager to attain higher levels both literally and figuratively.



Operations



America's Army:
Operations begins in
single-player mode with
a new recruit ready to
train.

He embarks on basic
rifle marksmanship and
combat training (BCT)
through a representation
of the ranges at Fort
Benning, Georgia.

Operations

The player's range score determines his advancement. If he scores poorly anywhere in training, he will not go on until scores improve.

Score well, and the player may advance to M-24 rifle qualification or US Army sniper school, where he will learn among other things to breathe at the right moment in the firing sequence, and get the most from an M-24 by using it on a bipod in a stationary position.



Realism ...



Weaponry is represented as precisely as possible; for example, weapons must be loaded and cleared as in real life, and the load is finite.

Modeling the real world

We achieved a high level of verisimilitude—soldiers who know Fort Benning easily recognize it within the game.

For example, the “Operations” BCT obstacle course is timed and sequenced as in the real life.



Operations

- Single-Player Training



Single-player training features the McKenna Military Operations in Urban Terrain (MOUT) course at Fort Benning, including use of the flash bang as the player clears a dark labyrinthine building of terrorist pop-up targets.

Multiplayer

- we are all the US Army

...

In the multiplayer part of “Operations” as many as 32 players can form a group (16 on 16).

So that no one plays a villain fighting the USA, each team sees itself as part of the US Army and the other team as the opposition. At the same time, the enemy perceive themselves as the U.S. Army and the other side as villains.



Cooperation & Team Play



The goal is not to blast everyone in sight, but to cooperate as a team intent on a purpose, which might be to identify a weapons cache, rescue a POW, or perhaps assault an airfield.

Scenarios are designed so that mission goals and objectives make sense to both teams, requiring one group to assault and the other to defend.

Playing by the rules ...

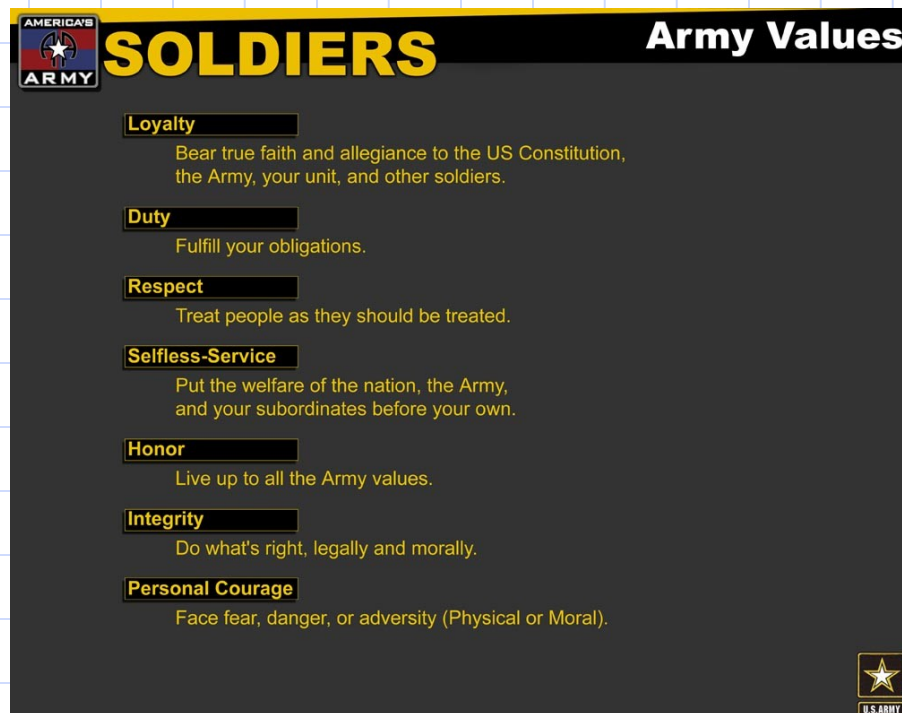
All players abide by rules of warfare. If a player violates the Uniform Code of Military Justice, rules of engagement, or laws of land warfare, reprisal is instant; he will find himself in a cell at Fort Leavenworth, accompanied by a mournful harmonica playing the blues.

Continued violation of the rules may cause a player to be eliminated from the game.

To rejoin, the player must create a new ID and start over.



Army Values



The mission-orientation of the US Army is insisted on; above all, soldiers must be team players, following Army values and rules.

Hearing is believing

“Operations” is rich aurally as well as visually.

Based on MOVES’ research indicating that complex, multilayered sound magnifies the sense of immersion in a simulation, the opulent sound created for “Operations” pulls one inexorably into the game. the game.

See a sound, hear a sound

In filmmaking, the rule is “see a sound, hear a sound”.

- This dictum was scrupulously observed in “Operations.”
- Sound effects, weapons foley, and ambiances were custom recorded or obtained from professional libraries.

Accurate audio representations ...

Weapons animations, for example, are accompanied by detailed and accurate audio representations that focus the player's attention on the weapons and heighten their emotional impact.

For added conviction

For added conviction, footsteps, bullet impacts, particle effects, grenades, and shell casings are accorded texture-specific impact noises.

A flying shell casing clinks differently on concrete, wood, or metal, for instance, and the distinction is clearly heard in the game.

Likewise, footsteps on dirt, mud, wood, concrete, grass, metal are sounded correctly.

With a little help from our friends ...

“Operations” benefited from the advice of many talented people in the entertainment industry, including Gary Rydstrom at Skywalker Sound, who provided helpful insights into the design of weapons audio and proper use of ambiances.

Dolby Digital 5.1!

Game audio also benefited greatly from interactions with Dolby Laboratories and received Dolby Digital 5.1 Surround Certification, one of the first PC-based videogames to be released with this designation.

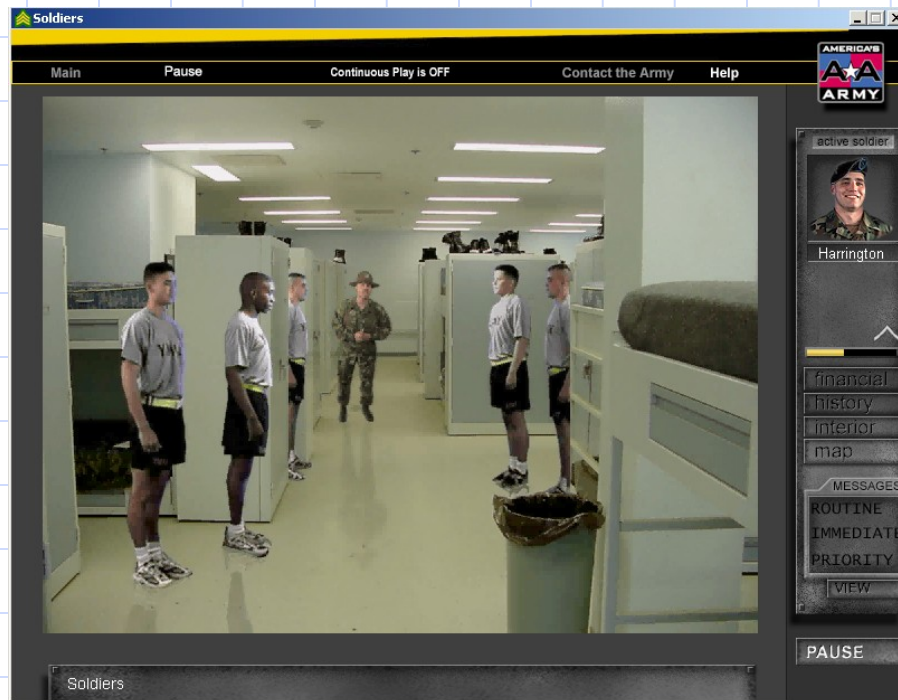
America's Army: Soldiers

As we have seen, “Operations” focuses on combat training and missions. But while these are critical, they represent only a small part of army life and opportunities. The “Soldiers” development team was charged with presenting an unvarnished view of a wide range of army career fields.

The “rest of the army” that “Soldiers” depicts includes basic training (drill instructors and all), advanced specialty training, on- and off-duty life, and enjoyment of the facilities available to servicemen and their families.



Soldiers



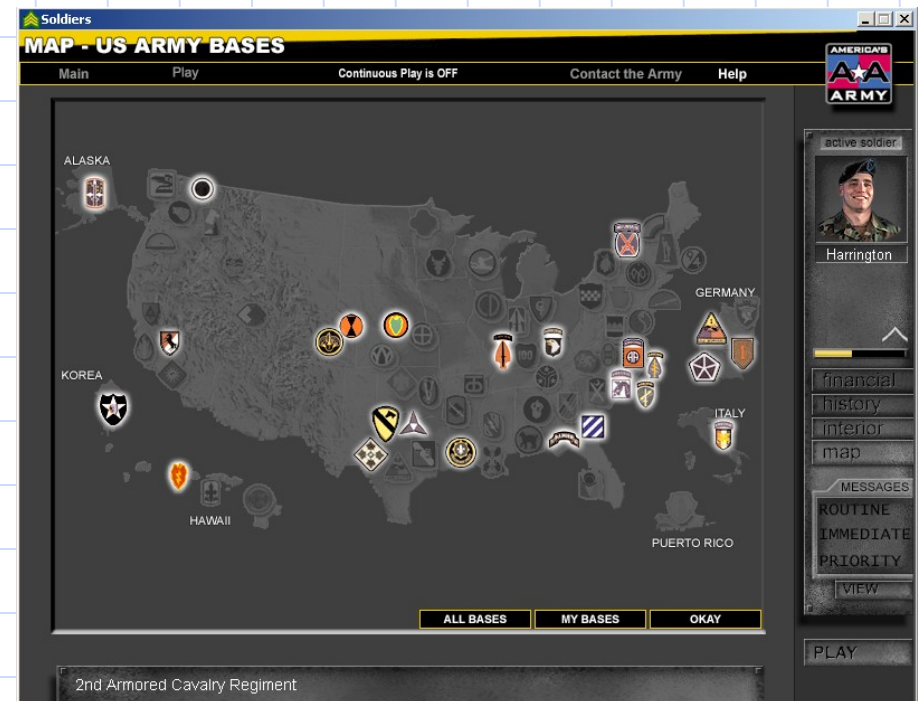
All was done as accurately as possible, not only in portraying what army life is all about, but in the appearance of bases, offices, barracks and facilities.

To complement the excellence of "Operations" and depict army locations with maximal realism, digital imagery was employed as the display medium.

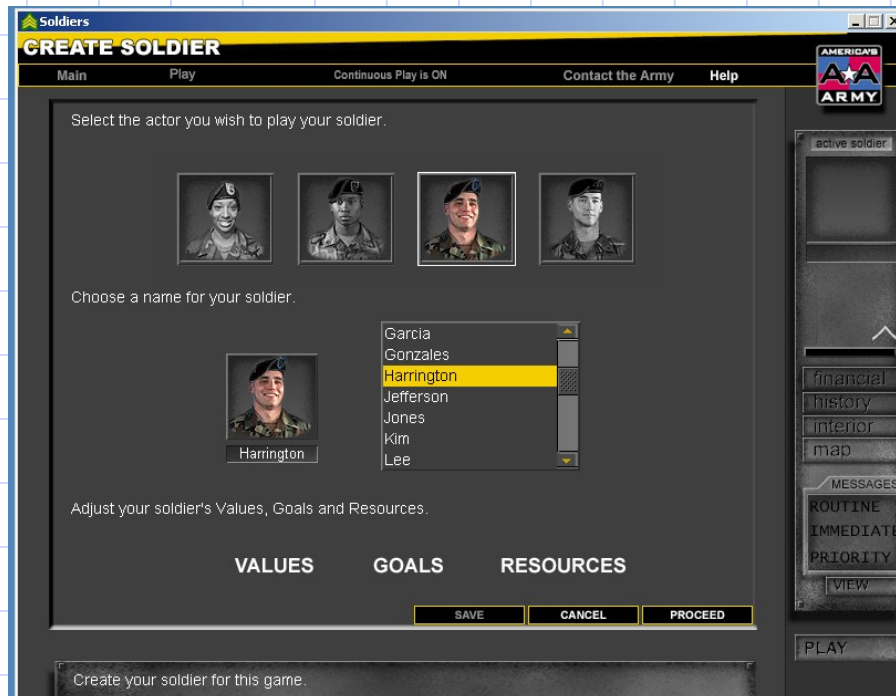
Homegrown

Unlike “Operations,” for which MOVES was able to buy the latest commercial game engine, no existing engine satisfied the peculiar requirements of “Soldiers.”

The entire system had to be designed and built from scratch. “America’s Army: Soldiers” consists of four main components: a story engine, location generator, animation engine and text-to-voice system.



Selecting a character



Underlying “Soldiers” is a story engine that constructs and sequences scenes to create interactive storytelling.

The player imbues a character with a set of personality traits (based on the army’s seven core values) and guides it through a career, managing its resources and deciding its fate.

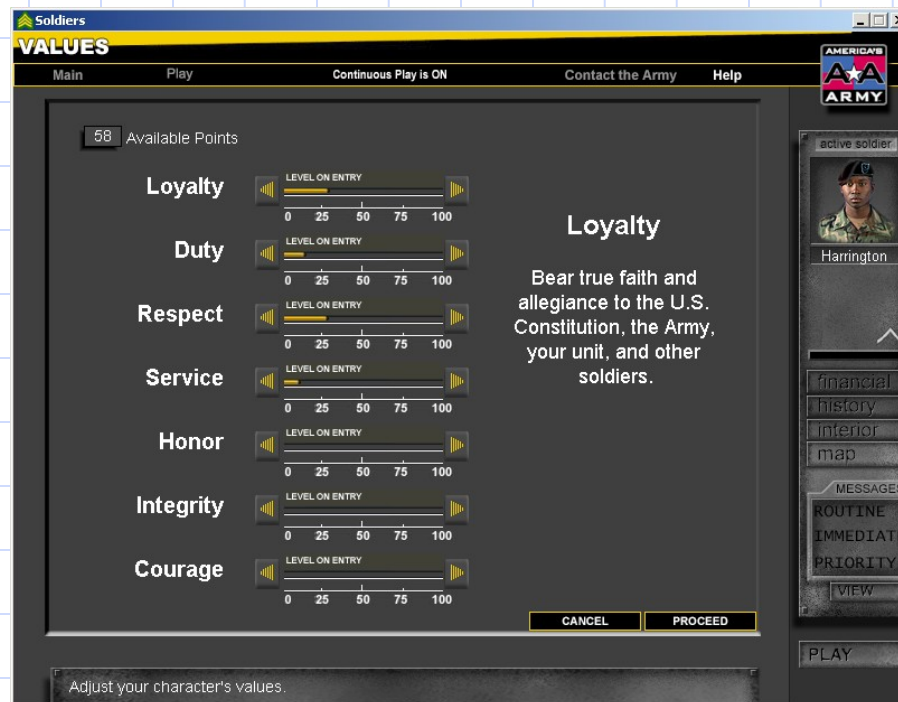
Goals & Values

The player wins his character's "trust" through good decisions that give him increasing access to the character's interior, where he can tweak its goals and values.

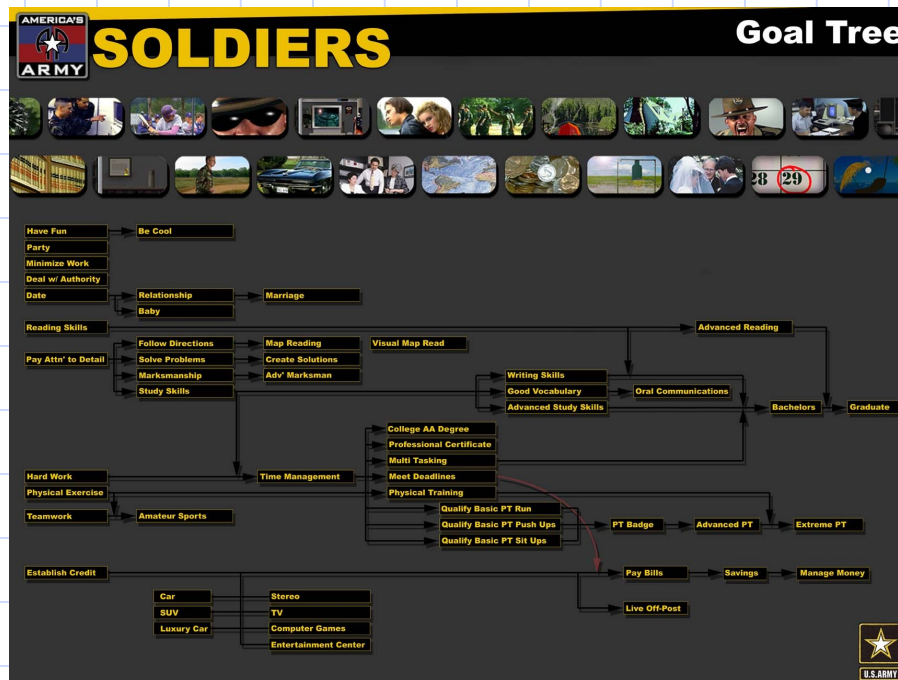
These manipulations propel the character through a career in a number of specialties. Along the way, the player gets a glimpse of what army life offers and demands.



Values



Soldiers Technology



The Story Engine

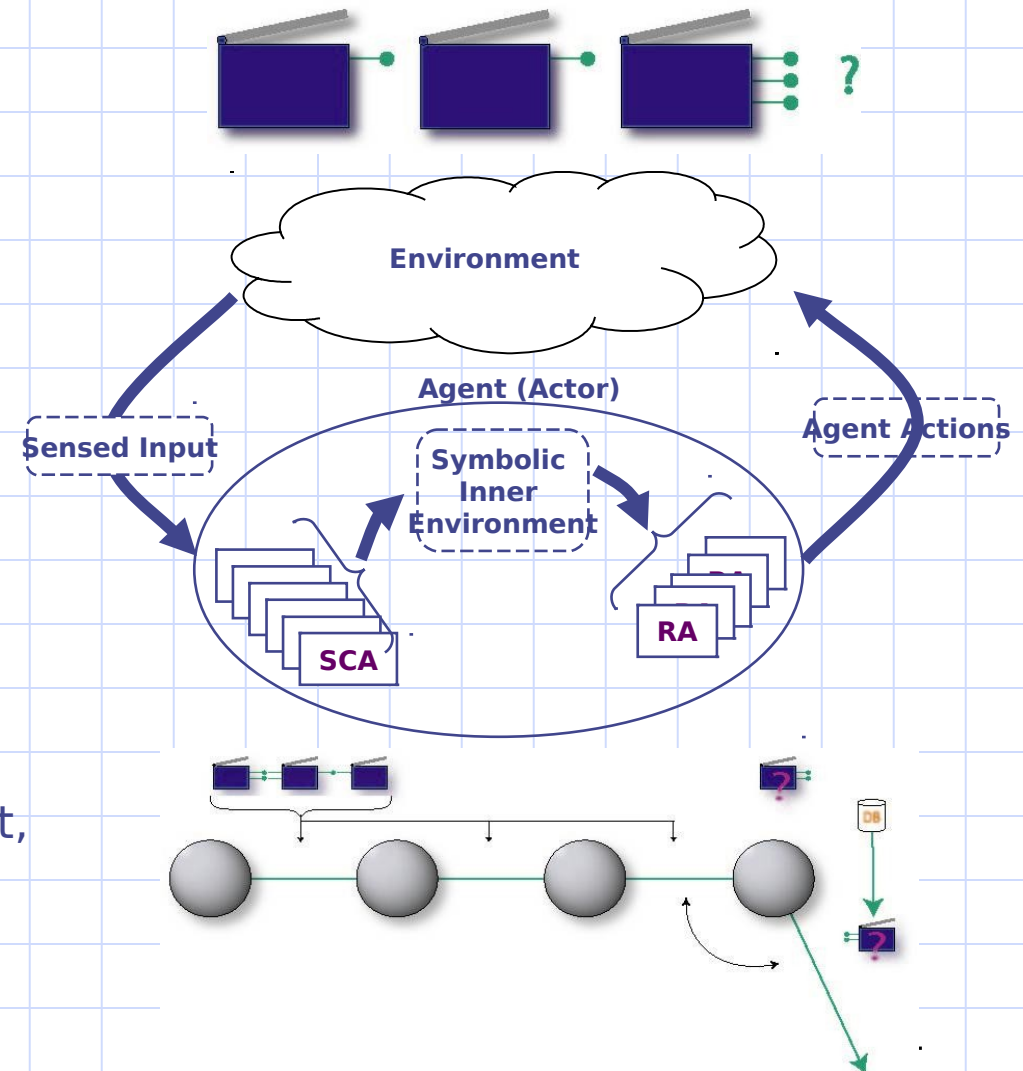
The Location
Generator

The Animation Engine

Multi-Agent Systems

For the past three years, the MOVES Institute's computer-generated autonomy group has been exploring multi-agent system simulation architectures that make the development of complex, adaptive behavior easier to achieve and control.

This research has produced four agent-based simulation design concepts for modeling multi-agent systems and implementing the models in software simulations: composite agents, goal management, tickets and connectors.



Connector-Based Multi-Agent Systems

From our work, a novel simulation methodology, capable of generating dynamic plans and interactive stories, emerged.

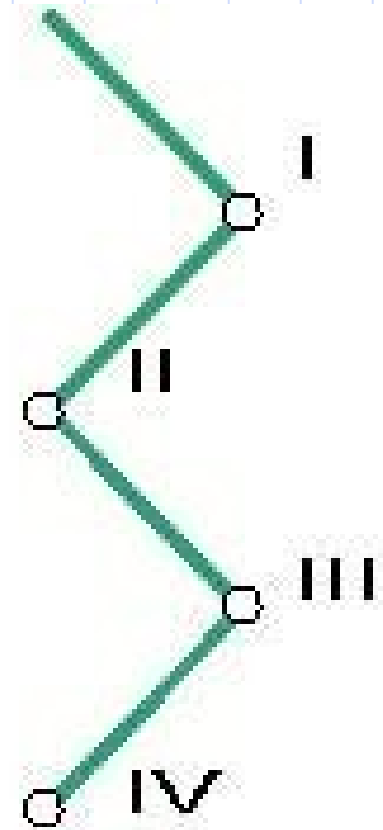
Called connector-based multi-agent simulation (CMAS), the architecture serves as the underlying model for the story engine.

The Story Engine

The story engine is actually a general-purpose simulation engine that generates dynamic plans.

Stories evolve as a by-product of observing constraints previously defined on agents within the simulation.

t



Stories are plots generated through discovery

In other words, stories are plots generated through discovery rather than fixed plans defined beforehand; they are produced through a simulation process called connecting, whereby agents are bound together according to a “best-fit” axiom.

The result of a successful connection is the next step in the plan (or, to put it another way, the next visualization of a scene in the story).

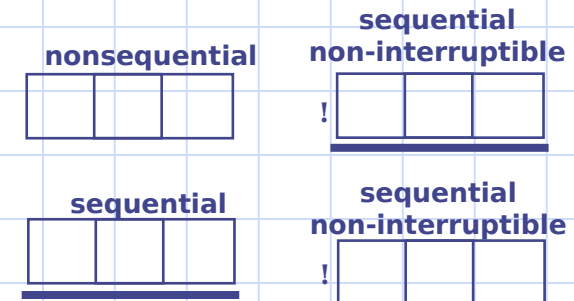
By this means, dynamic plans, or stories, evolve as the simulation runs.

More story engine ...

The story engine uses tickets and connectors extensively to generate interactive, dynamic stories.

Because the intention of “Soldiers” is not to tell a predetermined story, but to cobble a credible plot on the fly, a typical story consists of goal-driven autonomous characters (such as protagonist, drill instructor, buddy, and supporting characters), a narrative structure closely aligned with the main character, and a collection of potential scenes—along with media, dialog, and interactions to populate the scenes.

Combined dynamically at runtime, these elements produce story lines that reflect the characters’ actions, relationships, and personalities.



Characters & Scenes

There are two primary classes of agents in the story engine: characters and scenes.

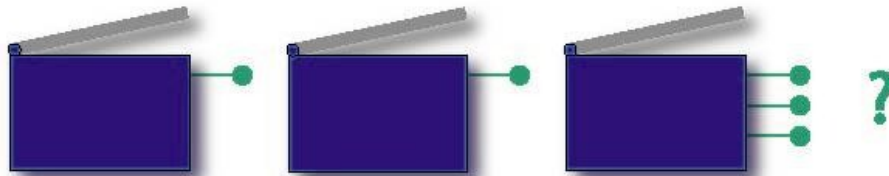
Through a process of connecting, the main character “binds” to a scene, and the scene in turn binds to resources such as supporting characters and media elements.

Once resource requirements have been met, the scene executes based on the goals, values and resources of the characters.

Presenting a scene on screen

During scene execution, the story engine interfaces with the location generator, animation engine, and text-to-voice system to manufacture and present a scene onscreen.

Character internal state



As the scene unrolls, the internal state of each character is updated; for instance, in a training scene a character's skill may increase and capabilities grow.

When the scene is over, the process begins anew with the main character binding to another, logically consequent, scene.

With scenes dynamically constructed at runtime, the story engine generates a plot that adapts to the user's interventions; as the story plays out, the player is free to intervene and adjust his character's goals and values. The result is a story personalized to the player's will.

Instrumentation

With the Army Research Institute, we looked into whether a game player's aptitude for an army career could be computed from game play.

The work from ARI looks promising and may appear in a later version of the game;

Meanwhile, the conclusion is that the Army will not receive aptitude data unless the player willingly forwards it to the Army by opting in.

E3 - 22 May 2002

E3 Booth

Our booth at E3 had giant display screens high above the convention floor.

Every two hours an Army bugler called in an armed company of men simulating an air insertion, including soldiers scrambling down ropes hung from the ceiling of the Los Angeles Convention Center.

The long lines to our booth unfortunately blocked our Sony Playstation 2 neighbors next door (thankfully their head of security was retired Army).

























































E3 Video

Play video

AmericasArmy.com

22 May 2002 Wednesday

- 180,000 unique visitors/hour
- 18,000 pages served every 5 seconds

Just to see images from the game (not on the Net until 4 July 2002).

May 22, 2002

[Talk about it](#) [E-mail story](#) [Print](#)

Army's New Message to Young Recruits: Uncle 'Sim' Wants You

■ Technology: The service has created video games to woo a media-savvy generation with a simulation of military life.

By ALEX PHAM, Times Staff Writer

America's youth would rather play video games than do push-ups in the mud--a reality the U.S. Army wants to harness to its advantage.

Eager to prove it's not your grandfather's military, the Army is developing video games to recruit and build awareness among Generation Y.



Today at the Electronic Entertainment Expo in Los Angeles, the Army will unveil two games designed to appeal to a media-saturated, tech-bombarded generation. One is a sanitized version

Photo Gallery



The Army's Video Game

Times Headlines

[Bonanza for Art of the West](#)

[INS Error Cited on Atta's Visa](#)

[FBI Expects Suicide Bomb Attack in U.S.](#)

['Gangs' Acts Locally but Thinks Globally](#)

[Guardman Mostly Kept Danger to Himself](#)

[more >](#)

AGP Awards

Frictionless Insight, E3 Awards, “Best
Business Model (Developer),” 5/27/02

Gamespy, Runner Up, Best PC Action Game

IGN, Biggest Surprise, 5/29/02

Wargamers, Best of Show, First-
Person/Tactical Shooters, 6/4/02

Well-Rounded Entertainment, “Best of E3
2002,” 6/01/02

AGP

- Reviews & Previews

Frictionless Insight, game review editors, "America's Army, the Official U.S. Army Game," 5/27/02

Gamesdomain, "America's Army: Preview," by Richard Greenhill, 6/2/02

Mygamer.com, "The US Army likes Unreal," game review editors, 5/21/02

CNET Reviews, "Virtual metal jacket," by Darren Gladstone, senior editor, 6/14/02

GamesFirst!, "Preview, America's Army," by Paul Cockeram, 6/8/02

IGN.COM, "'America's Army:' The Army's making a game of its own now", 5/30/02

Gamespot PC, "America's Army: Operations," by Amer Ajami, 7/02/02

Zengamer, "America's Army: Operations" by Marcin Manek, 7/6/02

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Adrenaline Vault, "U.S. Army Introduces America's Army," by David Laprad, 5/22/02

Blue's News, "U.S Army Licenses Epic Games' Unreal Engine for PC Game," 5/21/02

BusinessWeek Online, "The Army's New Killer App," by Arlene Weintraub, 5/22/02

Christian Science Monitor, Video game offers young recruits a peek at military life, by Gloria Goodale, 5/31/02

CNN, "Army is looking for a few good gamers," by Renay San Miguel, 5/22/02

CNNMoney, Your tax dollars at play, by Chris Morris, 6/3/02

CNET, "U.S. Army invades game business," by David Becker, 5/22/02

Dolby, press release, "Dolby Lends Expertise to Sound Design Team for America's Army: Operations, Combining Realism and Emotion," 7/1/02

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HomeLan Fed, "America's Army: Operations Interview," by John Callaham, 5/22/02

LA Times, "Army's New Message to Young Recruits: Uncle 'Sim' Wants You," by Alex Pham, 5/22/02

LANparty.com, gaming editor's review, "America's Army: Operations," 5/23/02

Monterey Herald, "NPS-spawned war games catching on big," by Kevin Howe, 7/23/02

MSNBC, "Video Game Used To Recruit For Armed Forces, " 5/22/02

Reuters, "Army Turns to Computer Games to Woo Recruits," by Franklin Paul, 5/23/02

San Francisco Chronicle, "Adopting the latest thing in advertising, Army out to do some computer recruiting," by Carrie Kirby, 8/5/02

AGP Articles

San Jose Mercury News, "U.S. Army invades video game territory," by Anthony Breznican, 5/23/02

US Army, press release, "U.S. Army Introduces 'America's Army' PC Game," 5/22/02

USA Today, "Army gives new meaning to war games — on a PC" by Marc Saltzman 5/22/02

Wall Street Journal, "Videogame Players to Get Look at Life in the U.S. Army," by Patrick Maio, 5/23/02

Washington Post, "A Chance to Be All That You Can Be— In a Virtual Army" by Jeff Adler, 5/23/02

Washington Post, " Army Recruiting Through Video Games," by Anthony Breznican, 5/23/02

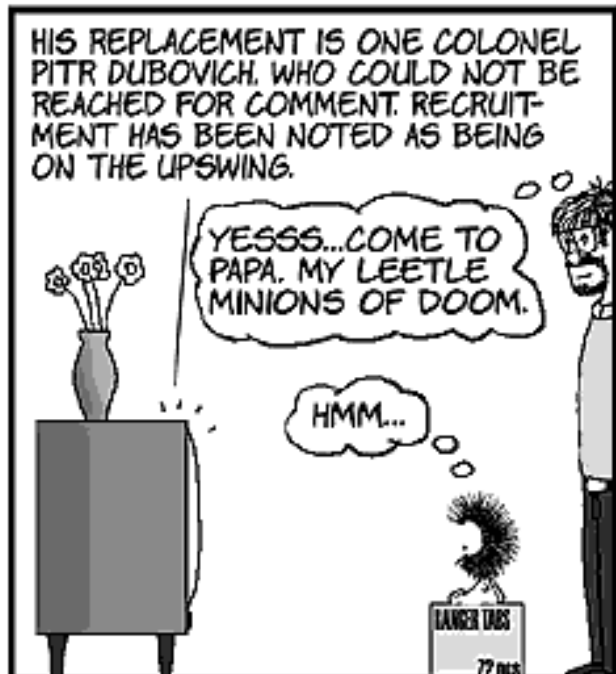
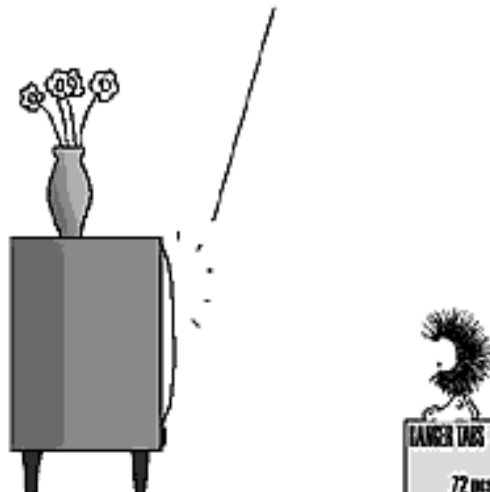
Popular Culture

USER FRIENDLY by Illiad



COPYRIGHT © 2002 ILLIAD HTTP://WWW.USERFRIENDLY.ORG/

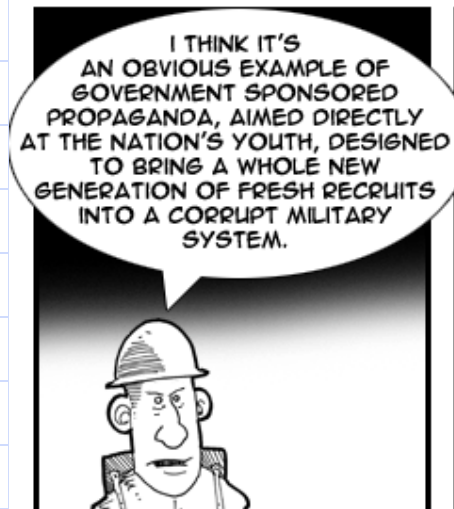
NOTABLY, THE OFFICER IN CHARGE OF THE NEW ARMY RECRUITMENT CAMPAIGN HAS LEFT ON A SABBATICAL IN ANTARCTICA.



Popular Culture ...

RealToons!

BY SCOTT JOHNSON



Video

Operations Single Player

Operations Missions

Soldiers

Production Shots

Born on the 4th of July 2002 ...

On July 4 at 12:01am, the first ten levels of “America’s Army: Operations” were posted to the Internet, and by noon the next day, 500,000 downloads of the 211MB game had been made.

The Army’s 140 servers were swamped, and we rushed to complete and post the community server kit the same week.



Community servers everywhere ...



By July 15, we were seeing approximately 1,900 servers.

By August 21, 6,500 servers.

- 20 - 30 players per server ...

Millions & millions of downloads ...

By July 22, “Operations” had been downloaded 40 million times.

Our HomeLAN game-server contractors cited a download rate double that of any previous free game or update, and from these statistics suggested “Operations” may prove the top-played game ever—but of course, time will tell.



As of 12 Aug 2002

Game use as of August 12
saw:

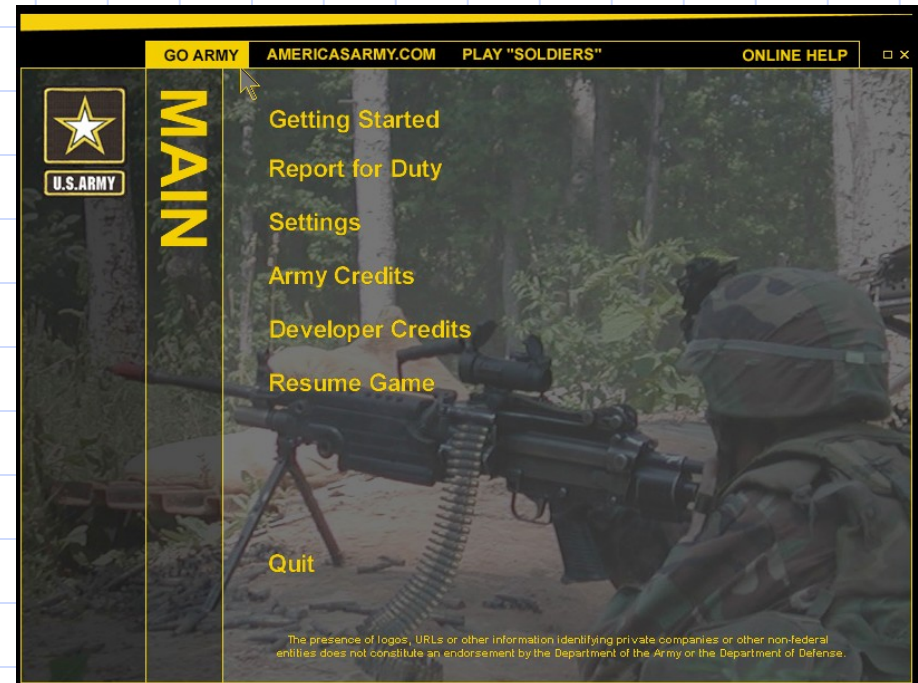
- 545,702 registered accounts,
- 322,860 graduates of BCT, and 8,855,361 missions completed (averaging 6-10 minutes).
 - ◆ 1,500,000 hours, 62,500 days, 171 years of play in 40 days (@10min/mission)
 - ◆ Per year - 1560 years of game play ...

Missions per day averaged 253,010, with players typically accomplishing 21 missions after BCT.

One avid player enacted 3,600 missions in the first 40 days of launch, spending ten or more minutes at each level.

GoArmy.com!

Though the Army has used www.goarmy.com as a recruitment site for years, traffic is way up—about 22% of hits now originate from the “America’s Army” game.



CD Distribution ...

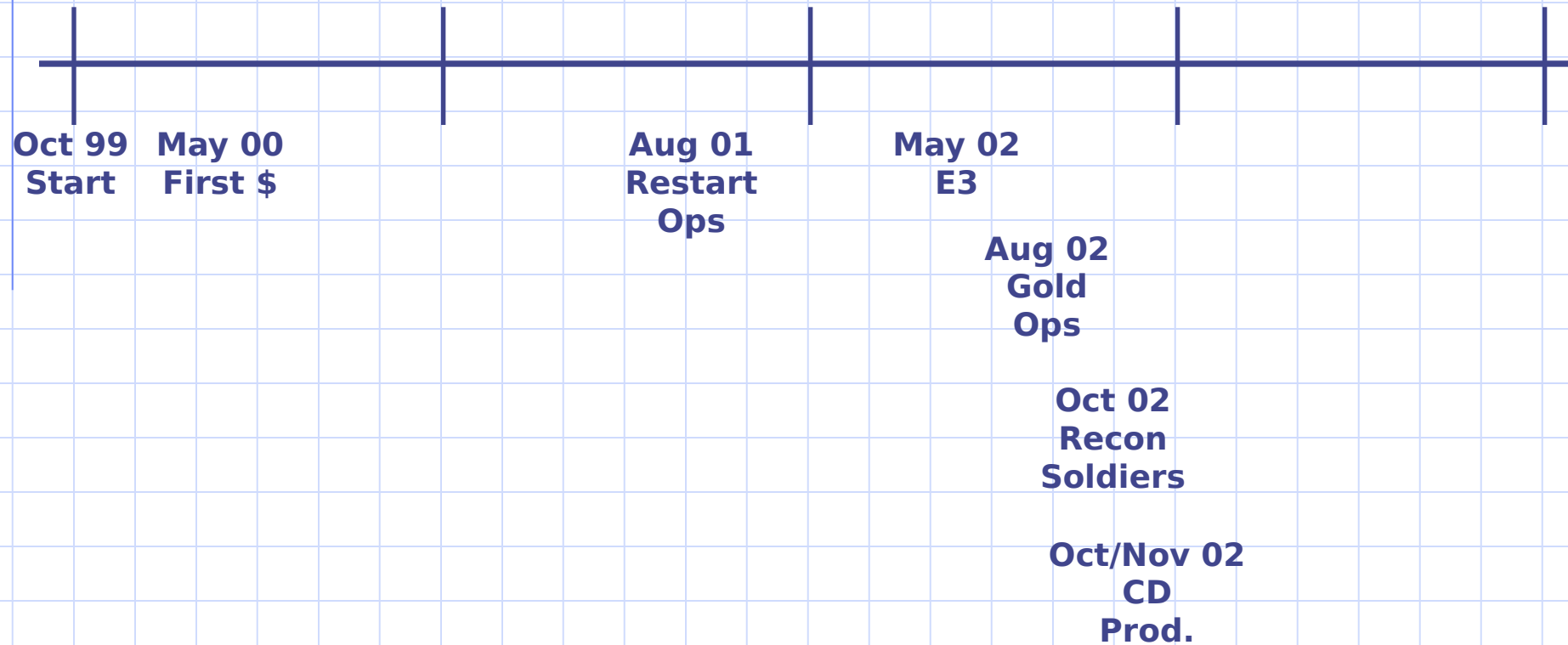


Mass production and distribution of the “America's Army: Operations” CD begins September 1.

In mid-autumn, Army recruiters will receive CDs direct from the factory, in initial quantities of 50 units apiece (for a total of 300,000 to all stations).

One-hundred thousand CDs are slated for Army events and 100,000 for fulfillment by mail, and a million disks will be inserted in popular gaming magazines.

Timeline



Next Up ...

AGP Futures

MOVES has much more to do and five years of promised funding in which to do it.

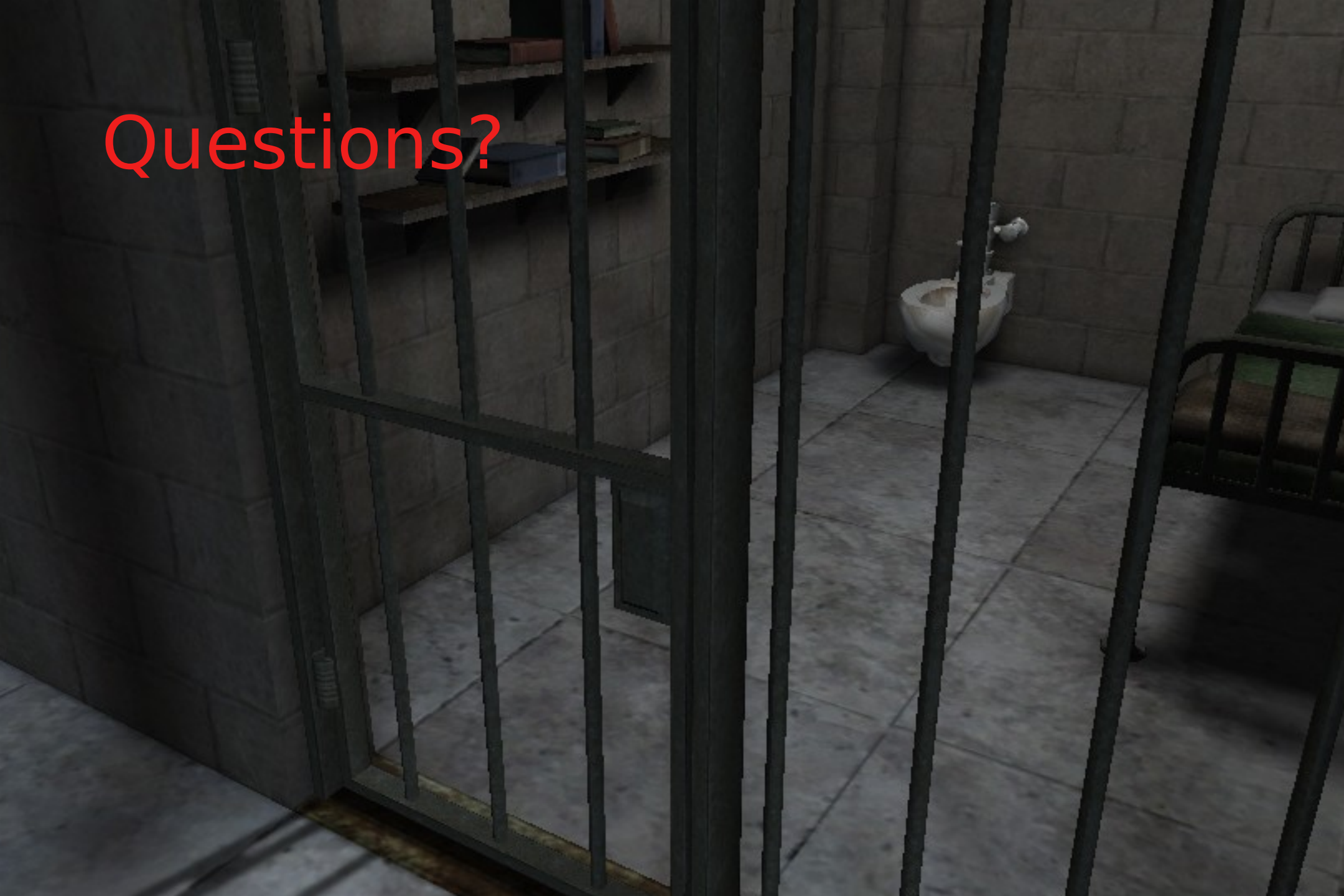
We anticipate new missions, levels, and games, and more entertainment R&D in the pipeline.



Futures

Prototyping for the
Army's Objective Force
A vehicle for infantry
training
Secret Service WH
Protection
WMD Recovery Trainer
... ?

Questions?



In closing ...

